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This report of the Teacher Aide Program in the Minneapolis, Minn., Public Schools, funded under Title I of the Elementary and Secondary Education Act, is divided into four sections. The first section is "An Overview of the Evaluation of the Teacher Aide Program, Academic Year, 1966-67." The next two sections summarize questionnaire responses of the 254 aides who participated in the evaluation; a description of the aides and an analysis of duties they performed is provided. The fourth section reports an experiment conducted during the second semester of 1967 to assess whether teacher aides could be used effectively to help develop reading readiness in kindergarten children. (SG)

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# TEACHER AIDE PROGRAM

## 1966-67

Funded Under Title I

Elementary and Secondary Education Act

of 1965

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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SP001937

# AN OVERVIEW OF THE EVALUATION OF THE TEACHER AIDE PROGRAM, ACADEMIC YEAR, 1966-67

During the academic year, 1966-67, 307 teacher aides were working in the Minneapolis Public Schools. Of these, 260 aides were hired with federal funds and worked in target area schools while the remaining 47 aides were hired with local funds and worked in schools outside the target area. The use of local funds to hire 47 teacher aides was believed to be an indication that professional staff members regarded the teacher aide program as successful and valuable.

Table 1 was organized to show numbers of aides assigned to elementary, junior high, and senior high schools. More than half the aides (67.7%) were assigned to elementary schools.

Table 1

The Assignment of Aides to Elementary Schools, Junior High Schools, and Senior High Schools

| School Level | No. of Schools with Aides T.A. | Non-T.A. | Total No. Schools in Mpls. | Percent Schools with Aides | No. of Aides | Percent of Aides at Each Level |
|---|---|---|---|---|---|---|
| Elementary Schools | 19 | 5 | 69* | 34.8% | 172 | 67.7% |
| Junior High Schools | 5 | 2 | 14 | 50.0% | 42 | 16.5% |
| Senior High Schools | 3 | 3 | 10** | 60.0% | 40 | 15.8% |
| Total | 27 | 10 | 93 | 39.8% | 254 | 100.0% |

* Excluding special category schools
** Excluding Vocational High School

During the school year , 1966-67, federal projects were divided into components. For the year 1966-67, Component 6 of Project 1 was comparable to the Teacher Aide Project of the previous school year. However, funds from other components of Title I, O.E.O., and local district budget were also used to pay for the services of teacher aides. The distribution of aides by programs was set forth in Table 2 (all tabled Title I components were parts of Project 1).

Table 2

The Distribution of Aides by Programs

| Programs | No. of Aides Employed | No. of Aides Responding | Percent of Responses |
|---|---|---|---|
| Component 2, Staff Utilization Teacher Aides, Title I | 11 | 9 | 81.8% |
| Component 3, Kindergarten Aides, Lunch Program, Title I | 10 | 10 | 100.0% |
| Supervisory Aides, Lunch Program, Title I | 51 | 41 | 80.4% |
| Component 4, Lincoln Experimental Junior High School, O.E.O. and Title I | 6 | 2 | 33.3% |
| Component 6, Teacher Aides, Title I | 171 | 149 | 87.1% |
| Component 9b, Research Aides, Title I | 3 | 2 | 66.7% |
| Grant School, Curriculum Resource Center, O.E.O. | 8 | 6 | 75.0% |
| Board of Education, Teacher Aides, Not federally funded | 47 | 35 | 74.5% |
| Total | 307 | 254 | 82.7% |

Each principal was responsible for deciding how many Component 2 aides he wanted for his building as well as for hiring them and all other aides assigned to the building. It was also the principal who determined aides' assignments and the kinds of tasks that they would be permitted to perform. Since all buildings had previously worked with teacher aides, principals and teachers had many ideas about how their services could be used effectively. Staff members were encouraged to continue to explore new ways to use the services of aides that would be beneficial to children's growth.

During the week of April 17, 1967, 254 of the 307 aides participated in one of two evaluation meetings. Questionnaires were completed which

described the aides and their work. As the evaluators talked with principals and teachers during the course of the academic year, there was no indication that they perceived the roles and values of teacher aides to be different from last year (1965-66) in any important ways. Therefore, questionnaires inquiring about the roles and values of teacher aides were not sent to teachers and principals during the academic year, 1966-67.

The remainder of this report has been divided into three sections. The first two have summarized questionnaire responses of the 254 aides who participated in the evaluation and have provided:

--a description of aides, academic year, 1966-67

--an analysis of duties performed by aides, 1966-67.

The third section has reported a research project carried forward during the second semester, 1967. This experiment attempted to assess whether teacher aides could be used effectively to help to develop reading readiness in kindergarten children. With this project, teacher aide evaluation in the Minneapolis Schools has stepped into a new dimension, that of experimental research.

## A DESCRIPTION OF AIDES, ACADEMIC YEAR, 1966-67

The following discussion has summarized questionnaire responses of 254 aides. In cases where it was impossible to interpret a response to a particular item, that response was not included. Therefore, the total number of responses for a few items might be somewhat less than 254.

Seven respondents were male and 247 were female. They ranged in age from 19 to 66 years, with a mean age of 40.5 years. (It was interesting to note that the mean age was one year greater than that for aides last year, when the mean was 39.5 years.)

The length of time that aides had lived in the neighborhoods where they resided at the time of the meetings ranged from less than one year to 48 years, with a mean residence of 11.3 years. Home ownership was reported as follows:

| | | |
|---|---|---|
| Own Home | 145 aides | 57.1% |
| Rent Home | 35 | 13.8% |
| Own Apartment | 2 | 0.8% |
| Rent Apartment | 69 | 27.1% |
| No Response | 3 | 1.2% |
| Total | 254 aides | 100.0% |

It was found that 79.2% of the aides worked in the elementary school districts where they lived, 20.0% lived in a district other than that in which they worked, and 0.8% did not respond to this item.

The marital status of aides was reported as follows:

| | | |
|---|---|---|
| Single | 7 aides | 2.8% |
| Married | 198 | 77.9% |
| Widowed | 17 | 6.7% |
| Separated | 8 | 3.1% |
| Divorced | 23 | 9.1% |
| No Response | 1 | 0.4% |
| Total | 254 aides | 100.0% |

For those aides who were not single, family size ranged from no children to seven children, with a mean family size of 3.63 children.

One hundred seventy respondents (66.9%) had worked previously as aides for periods of time ranging from 2 to 15 months, with a mean length of previous service of 6.76 months. Eighty-four (33.1%) of the respondents had worked only during the 1966-67 academic year. Aides reported previous service as follows:

| | | |
|---|---|---|
| Summer Session, 1965 | 62 aides | 24.4% |
| Academic Year, 1965-66 | 121 aides | 47.6% |
| Summer Session, 1966 | 91 aides | 35.8% |

Percentages were calculated on the basis of the total number of respondents, 254. Many aides had served during several sessions. In addition, 10 aides (3.9%) had served previously as home visitors for periods of from one to three terms. It was interesting to note the sizeable group of experienced aides that has developed. Conversations with aides have reflected their concern for children's welfare and their own continued role in the process of education.

Aides' formal education ranged from 8 to 19 years, with a mean of 11.8 years. Forty-six aides indicated that they had attended special schools for periods of from one to ten years, with a mean of 1.7 years.

In addition to having previously held positions as aides or home visitors, aides reported having held other kinds of positions. These were reported in Table 3.

Table 3

Previous Employment of Aides
Other than that of Aide or Home Visitor

| Occupational Category | N | % |
|---|---|---|
| Professional, Semi-Professiona, Managerial, Self-employed | 13 | 5.1 |
| Clerical, Sales | 123 | 48.4 |
| Service Occupations | 42 | 16.5 |
| Agriculture, Fishery, Forestry | 0 | 0.0 |
| Skilled, Semi-skilled | 22 | 8.7 |
| Unskilled | 2 | 0.8 |
| Relief Programs | 0 | 0.0 |
| Retired, Pensions, Unemployed | 3 | 1.2 |
| Student | 1 | 0.4 |
| No Response | 48 | 18.9 |
| Total | 254 | 100.0 |

Occupations of aides' spouses were reported in Table 4.

Table 4

Occupations of Aides' Spouses

| Occupational Category | N | % |
|---|---|---|
| Professional, Semi-Professional, Managerial, Self-Employed | 56 | 22.0 |
| Clerical, Sales | 22 | 8.7 |
| Service Occupations | 27 | 10.6 |
| Agriculture, Fishery, Forestry | 0 | 0.0 |
| Skilled, Semi-skilled | 75 | 29.6 |
| Unskilled | 9 | 3.5 |
| Relief Programs | 0 | 0.0 |
| Retired, Pensions, Unemployed | 5 | 2.0 |
| Student | 3 | 1.2 |
| No Response | 57 | 22.4 |
| Total | 254 | 100.0 |

During the evaluation meetings, aides were given a separate questionnaire which requested family income information. They were not required to return this short questionnaire, but if they did so, they were asked not to identify themselves. Of the 254 aides attending the meetings, 195 reported income in a manner that could be categorized. Annual family income, excluding teacher aide income, ranged from $900.00 to $16,000.00, with a mean annual income of $6,366.00. The average income per family member was $1,377.83.

As descriptions of aides who were employed during the academic year, 1966-67, were compared with those of aides employed during 1965-66, there seemed to be no great differences. It was concluded that the characteristics of aides were much the same during the two academic years. It was found that 121 aides who had participated in the 1965-66 evaluation also participated in the 1966-67 evaluation.

In order to plan future in-service education for aides, it was important to assess their aspirations with respect to future employment. They were asked to respond to two questions:

> If it were possible, which of the following would you most like? (check one or more) See Table 5 for choices.
>
> If you could have the necessary training, what kind of position would you like for the future?

Aides' responses were reported in Table 5 and Table 6.

Table 5

Aides' Responses to the Question, "If it were possible, which of the following would you most like?"

| Extent and Kind of Employment | Aides Selecting Each Category* N | % |
|---|---|---|
| A Teacher Aide Position, Half Time | 81 | 31.9 |
| A Teacher Aide Position, Full Time | 103 | 40.6 |
| A Teacher Aide Position, a permanent job for your future | 132 | 52.0 |
| Some other kind of position as a permanent position for your future | 30 | 11.8 |
| No permanent position for the future | 6 | 2.4 |

* Since aides were asked to check as many categories as reflected their wishes, many checked more than one. Therefore, numbers do not total 254 or 100.0%.

Table 6

Aides' Responses to the Question, "If you could have the necessary training, what kind of position would you like for the future?"

| Kind of Position | N | % |
|---|---|---|
| Teacher | 40 | 15.7 |
| Counselor | 3 | 1.2 |
| Librarian | 2 | 0.8 |
| Social Work | 13 | 5.1 |
| Teacher Aide | 48 | 18.9 |
| Food Aide | 2 | 0.8 |
| Research Aide | 1 | 0.4 |
| Home Visitor | 2 | 0.8 |
| Work with Children | 3 | 1.2 |
| Business | 3 | 1.2 |
| Clerk, Stenographer | 29 | 11.4 |
| Bookkeeper | 15 | 5.9 |
| Data Processing, etc. | 5 | 2.0 |
| Student | 5 | 2.0 |
| Art | 1 | 0.4 |
| No Response | 82 | 32.2 |
| Total | 254 | 100.0 |

More than half of the aides indicated that they would like a permanent position as a teacher aide. Responses pointed up the desirability of upgrading the skills of teacher aides so that they will be able to serve the needs of children better. It is recommended that further research be done to

discover the kinds of children's needs that most require attention and those that aides can best serve. In-service education can then help aides to perform well in many areas of need.

## AN ANALYSIS OF DUTIES PERFORMED BY AIDES, 1966-67

The analysis of duties performed by aides was based upon the same categories of duties as those used in the 1965-66 evaluation except that one category was added: the period for a coffee break or relaxation. Table 7 was organized so that an easy comparison could be made between the percentages of time spent performing duties in each category by

--all aides who participated in the 1965-66 evaluation

--all aides who participated in the 1966-67 evaluation

--respondents working in each of the eight 1966-67 programs employing aides.

The 1966-67, Component 6 teacher aide group, considered by itself, was most like the total group of teacher aides for 1965-66, in purpose and role. When these two groups were compared, it was found that the 1966-67, Component 6 aides spent a greater proportion of time in routine duties, a slightly smaller proportion of time in the supervision of pupils in relatively large groups, but a much smaller proportion of time (-8.7%) giving personal attention to pupils.

When the total 1965-66 group of respondents was compared with the total 1966-67 group, it was found that proportionately more time had been spent this year in the supervision of pupils in relatively large groups. Some of this increase was attributed to the duties of the Component 3 aides who spent a great deal of time each day working in the elementary school lunch programs. When all aides for 1965-66 were compared with all aides for 1966-67, it was found that 1966-67 aides reported spending 11.5% less time giving personal attention to pupils than aides during the previous year.

TABLE 7

TIME ANALYSIS, BY CATEGORIES OF DUTIES

From Questionnaires Completed by Aides

| CATEGORIES OF DUTIES | 1965-66 PER CENT OF TIME SPENT IN EACH CATEGORY BY AIDES N = 231 | 1966-67: PER CENT OF TIME SPENT IN EACH CATEGORY BY AIDES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ALL AIDES WHO RESPONDED N = 254 | Comp. 2 Staff Util N = 9 | Comp. 3 Kgn Aides N = 10 | Comp. 3 Sup Aides N = 41 | Comp. 4 L. L. C. N = 2 | Comp. 6 Tch Aides N = 149 | Comp. 9b Res Aides N = 2 | Grant Sch Curr Res Aides N = 6 | Bd. of Ed. Aides Non-Target N = 47 |
| I. ROUTINE DUTIES | 50.0 | 47.5 | 72.9 | 21.0 | 25.7 | 39.0 | 54.1 | 100.0 | 56.7 | 41.3 |
| II. SUPERVISION OF PUPILS IN RELATIVELY LARGE GROUPS | 24.0 | 31.5 | 7.4 | 55.3 | 56.3 | 53.5 | 22.9 | 0.0 | 33.5 | 38.3 |
| III. GIVING PERSONAL ATTENTION TO PUPILS | 22.0 | 10.5 | 0.0 | 8.1 | 3.4 | 5.0 | 13.3 | 0.0 | 7.9 | 12.2 |
| IV. TALKING WITH PARENTS ABOUT SCHOOL VALUES AND RULES | | 1.0 | 7.1 | 0.8 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 1.5 |
| V. TALKING WITH STAFF MEMBERS TO HELP THEM TO UNDERSTAND PARENTS ETC. | CATEGORIES IV THROUGH VII 4.0% | CATEGORIES IV THROUGH VII 10.5% 1.1 | 0.0 | 0.8 | 0.5 | 1.7 | 1.2 | 0.0 | 0.7 | 2.0 |
| VI. COFFEE BREAK, RELAXATION, UNASSIGNED | | 4.4 | 5.1 | 4.6 | 5.8 | 0.8 | 4.4 | 0.0 | 1.2 | 3.9 |
| VII. OTHER KINDS OF DUTIES | | 4.0 | 7.5 | 9.4 | 8.3 | 0.0 | 3.3 | 0.0 | 0.0 | 0.8 |
| Mean number of hours spent per week by each group of aides | | 17.58 hrs | 18.7 hrs | 18.45 hrs | 17.11 hrs | 30.25 hrs | 17.78 hrs | 15.0 hrs | 16.79 hrs | 16.25 hrs |

The large lunch programs in six schools were partly responsible for the proportionately smaller amount of time spent giving personal attention to pupils during the 1966-67 school year. However, it was observed that relatively few teacher aides were assigned to only one teacher. Most of them spread their services among several teachers. In these cases it was impossible for aides to get to know children well. Division of aides' time among a number of classrooms defeated a major purpose of the program: providing children from disadvantaged homes opportunities to talk with and relate to adults who are interested in their welfare. It is recommended that, in the future, a decision be made about where aides' time is needed most (eg. school, grade level, kind of class) and that aides be assigned in sufficient numbers so that there is chance for providing effective support for pupils. It is recommended that an aide not serve more than one elementary school classroom. In some cases it may be advantageous, depending upon the purpose, to assign more than one aide to a classroom.

A few of the aides assigned to secondary schools have been worked into classrooms and have performed valuable services in areas such as home economics. However, most of the duties of aides in secondary schools have continued to be of a clerical nature. It is recommended that the roles and purposes of aides in the secondary schools be re-examined. It has been difficult for the evaluators to discern how their presence, in purely clerical capacities, directly or indirectly has benefited students.

## AN EXPERIMENT TO ATTEMPT TO DISCOVER WHETHER TEACHER AIDES CAN BE USED EFFECTIVELY TO HELP TO DEVELOP READING READINESS IN KINDERGARTEN CHILDREN

The 1965-66 evaluation included no measure of the effects on children of services performed by aides. Therefore, during the spring semester, 1967, an experiment was carried forward to attempt to answer the question: Can teacher aides be used effectively to help to develop reading readiness in kindergarten children? The general approach of this investigation could be used in subsequent experimental studies to attempt to discover:

--areas of pupil activity where aides' services could best contribute to pupil gain.

--kinds of services most effectively performed by aides.

--the optimum number of aides needed to perform a service in order to maximize pupil gains.

It was hypothesized that helping children to develop reading readiness was an important area where aides might work effectively. If lack of verbal skills has deterred some children from making the greatest possible gains in reading readiness, then it could be argued that more adults interacting with them could help them to develop these skills. Since there has been some evidence that children have made gains when there has been a ratio of approximately five children to one adult[1], this ratio was set for the experimental "saturation" group.

The purpose of the experiment was to discover whether the presence of teacher aides could contribute to increased reading readiness of kindergarten pupils during the second semester, 1967. The null hypothesis was:

$H_o$: There is no difference between groups of second semester kindergarten pupils in reading readiness mean gain scores on the Metropolitan Readiness Test.

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[1]Alice V. Keliher, "Effective Learning and Teacher-Pupil Ratio," Education Digest, January, 1967, 32, 20-22.

Selection criteria. Nine kindergarten classes taught by six teachers were identified which met the following criteria:

--Each classroom consisted of approximately 30 children.

--Of the thirty children in each classroom, approximately one-third had participated in Headstart during the summer of 1966. The reason for this criterion was to furnish data for some long-range Headstart follow-up studies.

--Approximately half of the classes met in the morning and half in the afternoon.

--Three teachers who had both morning and afternoon classes which met the other criteria.

--Only classes from schools that did not have lunch programs were included. (Where lunch programs existed, afternoon kindergarten sessions were shortened.)

Despite the fact that classes could not be randomly selected, there was little chance of bias on the part of the investigators in the selection process because there were nine classes which clearly met the above-mentioned criteria better than any others. The six teachers of the initially selected classes agreed to participate in the experiment.

The schools included in the experiment were target area schools but tended to be toward its periphery because, when schools serving lunches were ruled out, the schools in the heart of the target area were eliminated. Each of the teachers had worked with their classes one semester prior to the start of this experiment. When students were pretested at the end of the first semester, teacher effects were already present. The treatment, which consisted of introducing the services of aides into some of the classes, took place during the second semester with posttesting done late in May.

Design and testing procedure. A diagram of the design of the experiment has been presented in Table I-6-8. Six of the classes constituted the morning and afternoon classes of three teachers and made up Groups A and C. Each of these teachers had no aide in one class and five aides in the other. Teachers of Groups A and C were careful to use the added assistance for Group C only, so that effects would not be contaminated. Group B consisted of the classes of three teachers with one aide assigned to each class.

Table 8

The Experimental Design: Can Teacher Aides Be Used Effectively to Help to Develop Reading Readiness in Kindergarten Children?

| Group A<br>No teacher aide | Group B<br>One teacher aide | Group C<br>Five teacher aides |
|---|---|---|
| Class 1, Teacher 1<br>School W, P.M. | Class 4, Teacher 4<br>School Y, A.M. | Class 7, Teacher 1<br>School W, A.M. |
| Class 2, Teacher 2<br>School X, A.M. | Class 5, Teacher 5<br>School Y, P.M. | Class 8, Teacher 2<br>School X, P.M. |
| Class 3, Teacher 3<br>School X, A.M. | Class 6, Teacher 6<br>School Z, A.M. | Class 9, Teacher 3<br>School X, P.M. |
| N = 38 M<br>N = 37 F<br>N = 75 Total, Group A | N = 39 M<br>N = 40 F<br>N = 79 Total, Group B | N = 43 M<br>N = 37 F<br>N = 80 Total, Group C |

Aides came into the classrooms and the experiment began on February 6, 1967. It continued through June 2, 1967. Reading readiness was assessed by the Metropolitan Readiness Test, Form R (1949). Pretests were administered to 254 children in the nine classes during the period of January 25, 1967, through February 3, 1967. Posttests were administered to 248 children during the period from May 22, 1967, through May 26, 1967. Testing yielded 234 pairs of test scores.

Rationale. It was hypothesized that a teacher could use one aide as an extension of herself, as an assistant to help her with whatever she was doing. It would not be necessary for the teacher with one aide to develop a concept of the role of the aide separate from her own activity. It was hypothesized that it would be impossible for teachers with five aides in one classroom to proceed without giving a great deal of thought to the kinds of things that aides might accomplish which would be in addition to, or different from, what she might accomplish alone. The design of the experiment made it necessary for the three teachers of Groups A and C to think about differences

in the approach to problems of teaching and learning where there was only the teacher in the classroom (Group A), and where there were five adults in addition to the teacher (Group C).

In-service meetings were held on January 28, 1967, and February 18, 1967, for all participating teachers and any principals who wished to attend. The purpose of the meetings was to exchange ideas and to encourage teachers to use whatever approaches they thought might be effective in achieving maximum reading readiness gains. It was emphasized that, with more adults in the classroom, there could be greater opportunities for total participation of all children at all times: more activity, more verbal expression, more interaction. The tendency of adults to do things for children rather than helping children to learn to do things for themselves was explored. However, each teacher was completely free to use the services of her aides in any way that she believed to be best.

It was an unsettling experience to think of five adults coming into one classroom. Classroom administration problems also arose. At this point the investigators wish to thank the teachers who participated with good will and great capacity for innovation:

Mrs. Marilyn Byrnes
Mrs. Jean Clary
Mrs. Alma French
Miss Evelyn Froise
Miss Janelle Reichel
Mrs. Myrtle Willin

The work of the principals who hired the aides, explained "why some teachers get five aides and others none," and showed a real interest in educational experimentation was also appreciated:

Mr. Irvin M. Larson
Mr. Donald E. Murtha
Mr. Arthur C. Sloth
Mr. Charles F. Struck

As the semester progressed, teachers were surprised to find that there were important services that five added adults could perform in one classroom. An interest was expressed in trying a similar experiment in the

future. One of the teachers became most enthusiastic and wanted all of her aides back again.

It would have been valuable and interesting if the three teachers of Groups A and C had kept a diary to record:

--their feelings as five adults came into one kindergarten classroom.

--the problems that arose, both among adults and with children.

--techniques used to solve problems.

--ways that they tried to use aides' services effectively to increase reading readiness in children.

--areas where aides were successful in enhancing pupil learning.

--areas where aides did not seem to be successful in helping pupils to advance their learning.

However, the addition of five adults to one kindergarten classroom was a rather overwhelming prospect for any teacher. It was feared that added paperwork might change very interested and cooperative teachers into rather reluctant ones. Funds were available for only a maximum of three in-service meetings. It is recommended that further experimentation include provision for participants to record their feelings about working with adults in the classroom as well as their attempts to work through problems. The writers believe that weekly tape-recorded meetings would be an effective technique for ascertaining both essence and fact.

Analysis and interpretation of the data. In order to make a meaningful study of the major hypothesis, it was necessary to find out whether, at the beginning of the study, subjects were homogeneous with respect to reading readiness characteristics. Since it has been widely held that there are differences in readiness by sex, the following sub hypothesis was tested.

$H_1$: There is no difference in pretest mean scores on the Metropolitan Readiness Test between groups or by sex.

Three two-way analyses of variance were calculated, one for each of three aspects of the test. They were reported in tables:

Table 9

Analysis of Variance, Pretest Scores on the
Metropolitan Readiness Test, Form R
Tests 1-4, Reading Readiness
by Group and Sex

| Source of Variation | df | SS | MS | F |
|---|---|---|---|---|
| Groups | 2 | 14.2245 | 7.1123 | 1.7136 |
| Sex | 1 | 16.7959 | 16.7959 | 4.0468* |
| Interaction | 2 | 4.5833 | 2.2917 | 0.5522 |
| Adjusted | | 946.2912 | 4.1504 | |
| ERROR | 228 | | | |
| Unadjusted | | 36,804.7520 | | |

*Significant at the 5% level of significance
(Critical Value: $F_{.95}(1,228) = 3.8851$)
$F_{.95}(2,228) = 3.0367$) Optional

Table 10
Analysis of Variance, Pretest Scores on the
Metropolitan Readiness Test, Form R
Test 5, Number Readiness
by Group and Sex

| Source of Variation | df | SS | MS | F |
|---|---|---|---|---|
| Groups | 2 | 0.1836 | 0.0918 | 0.1477 |
| Sex | 1 | 1.5937 | 1.5937 | 2.5633 |
| Interaction | 2 | 2.6286 | 1.3143 | 2.1139 |
| Adjusted | | 141.7476 | .6217 | |
| ERROR | 228 | | | |
| Unadjusted | | 5513.4139 | | |

Critical Values: $F_{.95}(1,228) = 3.8851$
$F_{.95}(2,228) = 3.0367$

Table 11

Analysis of Variance, Pretest Scores on the
Metropolitan Readiness Test, Form R
Test 1-6, Total Readiness
by Group and Sex

| Source of Variation | df | SS | MS | F |
|---|---|---|---|---|
| Groups | 2 | 17.4130 | 8.7065 | 0.9941 |
| Sex | 1 | 34.7070 | 34.7070 | 3.9629 |
| Interaction | 2 | 15.4300 | 7.7150 | 0.8809 |
| Adjusted | | 1996.8240 | 8.7580 | |
| ERROR | 228 | | | |
| Unadjusted | | 77,663.9580 | | |

Critical Value: $F_{.95}(1,228) = 3.8851$
$F_{.95}(2,228) = 3.0367$

It was found that there were no significant differences, by groups, at the five percent level of confidence. However, there were significant differences at the five percent level of confidence, by sex, in reading readiness and total readiness. Therefore, analysis of covariance, which allowed for initial differences, was used to test the major hypothesis:

$H_o$: There is no difference between groups of second semester kindergarten pupils in reading readiness mean gain scores on the Metropolitan Readiness Test.

Three analyses of covariance were calculated and reported in Tables, 12, 13 and 14.

Table 12

Analysis of Covariance, Pretest and Posttest Scores
on the Metropolitan Readiness Test, Form R
Test 1-4, Reading Readiness
by Group and Sex

| Source of Variation | df | SS | MS | F |
|---|---|---|---|---|
| Groups | 2 | 9.1370 | 4.5685 | 3.8301 |
| Sex | 1 | 1.3963 | 1.3963 | 1.1706 |
| Interaction | 2 | 1.3597 | 0.6799 | 0.5700 |
| ( Adjusted | | 270.7758 | 1.1928 | |
| (ERROR | 227 | | | |

Critical Value: $F_{.95}(1,227) = 3.8859$
$F_{.95}(2,227) = 3.0373$

Table 13

Analysis of Covariance, Pretest and Posttest Scores
on the Metropolitan Readiness Test, Form R
Test 5, Number Readiness
by Group and Sex

| Source of Variation | df | SS | MS | F |
|---|---|---|---|---|
| Groups | 2 | 1.1177 | 0.5589 | 1.5869 |
| Sex | 1 | 0.8984 | 0.8984 | 2.5508 |
| Interaction | 2 | 0.2439 | 0.1219 | 0.3461 |
| Error, within cells (Adjusted) | 227 | 79.9412 | 0.3522 | |

Critical Value: F.95 (1,227) = 3.8859
F.95 (2,227) = 3.0373

Table 14

Analysis of Covariance, Pretest and Posttest Scores
on the Metropolitan Readiness Test, Form R
Tests 1-6, Total Readiness
by Group and Sex

| Source of Variation | df | SS | MS | F |
|---|---|---|---|---|
| Groups | 2 | 17.2669 | 8.6335 | 4.3387 |
| Sex | 1 | 5.8188 | 5.8188 | 2.9242 |
| Interaction | 2 | 4.5147 | 2.2574 | 1.1344 |
| Error, within cells | 227 | 451.7154 | 1.9899, Adjusted | |

Critical Value: F.95 (1,227) = 3.8859
F.95 (2,227) = 3.0373

It was found that, after initial differences had been adjusted by means of analysis of covariance, there were no significant differences, by sex, at the five percent level of confidence in reading readiness, numbers readiness, or total readiness. It was concluded that whatever differences there were by sex, they were not related to the treatment (the services performed by teacher aides).

Table 15

Unweighted Group Means, Pretest, Posttest, and Gain
Metropolitan Readiness Test, Form R
N = 234

| Test | Group A N = 75 | Group B N = 79 | Group C N = 80 |
|---|---|---|---|
| Tests 1-4, Reading Readiness | | | |
| Pretest | 41.813 | 38.215 | 40.725 |
| Posttest | 47.400 | 47.785 | 48.788 |
| Gains | 5.587 | 9.570 | 8.063 |
| Test 5, Number Readiness | | | |
| Pretest | 8.213 | 8.089 | 8.425 |
| Posttest | 11.613 | 12.114 | 12.665 |
| Gains | 3.400 | 4.025 | 4.350 |
| Tests 1-6, Total Readiness | | | |
| Pretest | 53.453 | 49.684 | 52.775 |
| Posttest | 63.867 | 64.835 | 66.363 |
| Gaines | 10.414 | 15.151 | 13.588 |

An inspection of Table 15 revealed that Group B, classes with a teacher and one teacher aide, experienced the greatest mean gains on tests of reading readiness and total readiness. Group A, the classes with a teacher and no aides, experienced the least mean gains in reading readiness. Group C mean gain scores fell between those of Group A and Group B. Test 5, numbers readiness, has not been discussed since analysis of covariance revealed no differences between groups at the five percent level of confidence. Table 16 shows posttest means adjusted for pretest effects for tests 1-4, and tests 1-6.

Table 16

Adjusted Posttest Means

| Test | Group A | Group B | Group C |
|---|---|---|---|
| Tests 1-4 (Reading Readiness) | 46.131 | 49.070 | 48.738 |
| Tests 1-6 (Total Readiness) | 62.701 | 66.634 | 65.731 |

The major findings, based on analysis of covariance, were that there were significant differences between groups at the five percent level of confidence in reading readiness (tests 1-4) and total readiness (tests 1-6). Analysis of covariance revealed no differences between groups, significant at the five percent level of confidence, in numbers readiness (test 5).

Post-test means were adjusted for pre-test effects on tests 1-6 and Sheffe's Test was used to analyze the adjusted means. (See Table 16.) It was found that differences between adjusted means of Group B and Group A were significant at the five percent level of confidence. Differences between Group C and Group A means approached this level. Differences between Groups B and C means did not approach significance at the five percent level of confidence.

Post-test means on tests 1-4 were also adjusted for pre-test effects and Sheffe's Test was applied to the adjusted means. It was found that none of the differences between adjusted group means were significant at the five percent level of confidence. However, differences between Group B and Group A, and differences between Group C and Group A, approached significance at the five percent level. Differences between Groups B and C did not approach significance.

It was concluded that teacher aides can be used effectively to help to develop reading readiness in kindergarten children. Children had gained more in reading readiness when aides were present in the classroom.

It was found that children made slightly greater gains in the group where only one aide worked in the classroom than in the group with five aides. However, it did not seem to make much difference whether there were five aides in the room, or one. It was inferred that when five aides were present in the classroom, the teacher spent more time training and supervising aides and less time working directly with children than she did when

only one aide was present. Since teachers are professionally trained to work with children, it was believed that directing the teacher's efforts elsewhere might not result in optimum pupil gain. Perhaps, if aides had been trained before coming into the classroom to work with children toward a specific classroom objective, increasing reading readiness, then aides' classroom activities might not have required the degree of teacher planning and supervision that was necessary during the experiment.

Results of this experimental study have indicated that the services of teacher aides can help to develop reading readiness in kindergarten children. It is recommended that future research programs investigate:

--the kinds of training necessary to make aides most effective in areas where their work has been found to result in pupil gains.

--the numbers of aides necessary to achieve optimum pupil gains in areas where it has been found that aides' services result in pupil gains.

--other areas where the services of aides result in significant pupil gains.

The researchers believe that the services of trained aides should free the teacher to work more closely with children in the areas where greatest professional skill and competence are required. It is recommended that aides continue to work directly with children in areas where it is discovered that their services are most effective. However, whatever the number of aides present in the classroom and whatever the kind of work performed, aides' services should enable the teacher to spend more time with children rather than less.

A film, available through the Minneapolis Public Schools, has been completed showing some of the activities of two classes of one of the teachers who participated in the research study. In one class there were five teacher aides and in the other there were none.